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U.S. DEPARTMENT OF COMMERCE PATENT AND TRADEMARK OFFICE

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TRANSMITTAL LETTER TO THE UNITED STATES
DESIGNATED/ELECTED OFFICE (DO/EO/US)
CONCERNING A FILING UNDER 35 U.S.C. 371

JFH-A13082US

U.S. APPLICATION NO. (IF KNOWN, SEE 37 CFR

Not Yet Assigned 10/031861

INTERNATIONAL APPLICATION NO.
PCT/EP00/03242

INTERNATIONAL FILING DATE
12 April 2000

PRIORITY DATE CLAIMED
08 May 1999

TITLE OF INVENTION

SCISSORS LIFTING DEVICE

APPLICANT(S) FOR DO/EO/US

Heckert, Gerold

Applicant herewith submits to the United States Designated/Elected Office (DO/EO/US) the following items and other information:

1. ☒ This is a **FIRST** submission of items concerning a filing under 35 U.S.C. 371.
2. ☐ This is a **SECOND** or **SUBSEQUENT** submission of items concerning a filing under 35 U.S.C. 371.
3. ☒ This is an express request to begin national examination procedures (35 U.S.C. 371(f)). The submission must include items (5), (6), (9) and (24) indicated below.
4. ☒ The US has been elected by the expiration of 19 months from the priority date (Article 31).
5. ☒ A copy of the International Application as filed (35 U.S.C. 371 (c) (2))
 - a. ☐ is attached hereto (required only if not communicated by the International Bureau).
 - b. ☒ has been communicated by the International Bureau.
 - c. ☐ is not required, as the application was filed in the United States Receiving Office (RO/US).
6. ☒ An English language translation of the International Application as filed (35 U.S.C. 371(c)(2)).
 - a. ☒ is attached hereto.
 - b. ☐ has been previously submitted under 35 U.S.C. 154(d)(4).
7. ☒ Amendments to the claims of the International Application under PCT Article 19 (35 U.S.C. 371 (c)(3))
 - a. ☒ are attached hereto (required only if not communicated by the International Bureau). in 23b. below
 - b. ☐ have been communicated by the International Bureau.
 - c. ☐ have not been made; however, the time limit for making such amendments has NOT expired.
 - d. ☐ have not been made and will not be made.
8. ☒ An English language translation of the amendments to the claims under PCT Article 19 (35 U.S.C. 371(c)(3)). in 23b. below
9. ☒ An oath or declaration of the inventor(s) (35 U.S.C. 371 (c)(4)).
10. ☒ An English language translation of the annexes to the International Preliminary Examination Report under PCT Article 36 (35 U.S.C. 371 (c)(5)).
11. ☒ A copy of the International Preliminary Examination Report (PCT/IPEA/409).
12. ☐ A copy of the International Search Report (PCT/ISA/210).

Items 13 to 20 below concern document(s) or information included:

13. ☒ An Information Disclosure Statement under 37 CFR 1.97 and 1.98. and 3 cited patents
14. ☐ An assignment document for recording. A separate cover sheet in compliance with 37 CFR 3.28 and 3.31 is included.
15. ☒ A **FIRST** preliminary amendment.
16. ☐ A **SECOND** or **SUBSEQUENT** preliminary amendment.
17. ☒ A substitute specification. and abstract
18. ☐ A change of power of attorney and/or address letter.
19. ☐ A computer-readable form of the sequence listing in accordance with PCT Rule 13ter.2 and 35 U.S.C. 1.821 - 1.825.
20. ☐ A second copy of the published international application under 35 U.S.C. 154(d)(4).
21. ☐ A second copy of the English language translation of the international application under 35 U.S.C. 154(d)(4).
22. ☒ Certificate of Mailing by Express Mail
23. ☒ Other items or information:

23a. Written Opinion dated 9/26/2000 & translation of Supplementary Sheet
23b. Response to Written Opinion dated 2/22/2001 and translation
23c. 1 drawing page
23d. Return postcard

23e. Check for \$445.00

Page 2 of 2

10/031861

531 Rec'd PCT/PT 07 NOV 2001

PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Patent Application of:

Gerold Heckert

Serial No.: Not Yet Assigned

Art Unit: Not Yet Assigned

Examiner: Not Yet Assigned

Filed: November 7, 2001

Title: SCISSORS LIFTING
DEVICE

EXPRESS LABEL NO. EL 741411852 US

I hereby certify that this correspondence is being deposited with the United States Postal Service as EXPRESS MAIL in an envelope addressed to: ASSISTANT COMMISSIONER FOR PATENTS, NEW APP FEE, WASHINGTON, D.C. 20231 on November 7, 2001.

Name: Kathryn L. Finder

Kathryn L. Finder November 7, 2001
Signature

Hon. Commissioner of Patent and Trademarks
Washington, DC 20231

PRELIMINARY AMENDMENT

Sir:

Applicant submits this Preliminary Amendment amending the application as follows:

IN THE SPECIFICATION:

On page 1, between the title and "Field of Invention" please add the following:

--Related Application and Claim of Priority

This application is a continuation of PCT Application No. PCT/EPO/03242 having an international filing date of April 12, 2000, which designates at least one country in addition to the United States and which claims priority from German Application Nos. 199 21 435.2 filed May 8, 1999 and 100 01 910.2 filed January 19, 2000. For priority purposes, this application claims the benefit of 35 USC 371 and/or 35 USC 120.--

Assuming the Examiner has entered the substitute specification, the Examiner is respectfully requested to cancel the specification which forms a part of Item 6 of the

10031861-10701

accompanying Transmittal Letter, the same being the Translation of the International Application into English.

IN THE CLAIMS:

Please cancel in the English language translation of the International Application claims 1-7 without prejudice. Please enter the following new claims

8. A scissors lifting device having a base unit, a carrier unit and at least one pair of scissors having inner and outer arms pivotably mounted at a scissors axle and connected to the base unit and carrier unit, the lifting device comprising:

- a drive for opening and closing the scissors;
- a drum parallel to scissors axis and coupled to the drive for rotational movement in both directions;
- at least one band having first and second ends, the first end connected to the drum to enable the band to be wound around the drum; and
- a lifting truck coupled to the second end of the band and positioned between the inner and outer arms so that the axle is between the drum and truck,

whereby the scissors are opened when the band is wound around the drum and the truck is pulled toward the scissors axle, and are closed when the band is unwound from the drum and the truck is forced away from the axle by the arms.

9. The scissors lifting device of claim 8 wherein the scissors arms have upper sections located between the axle and the carrier unit and lower sections located between the axle and the base unit and the lifting truck is guided by a lifting cam that is arranged on one of the lower section of an arm or the upper section of an arm.

10. The scissors lifting device of claim 8 wherein the scissors arms have upper sections located between the axle and the carrier unit and lower sections located between the axle and the base unit and the lifting truck is guided by lifting cams that are arranged both the lower section of an arm and the upper section of an arm.

11. The lifting device of claim 9 wherein the lifting cam is adjustable and replaceable.
12. The lifting device of claim 8 wherein one arm is pivotably connected to the base unit at a first pivot axis and the drum is positioned at the first pivot axis.
13. The lifting device of claim 8 wherein one arm is pivotably connected to the base unit at a first pivot axis and the drum is positioned such that the distance between the drum and axle is greater than the distance between the first pivot axis and the axle.
14. The lifting device of claim 8 wherein the drive includes a frequency-controlled electric motor.
15. The lifting device of claim 8 wherein the drive includes a brake for realizing controlled lowering of the carrier.
16. The lifting device of claim 8 further including a catch to prevent an uncontrolled lowering movement.
17. A scissors lifting device comprising:
- a base unit;
 - a carrier unit;
 - an inner arm having first and second ends, the first end pivotably mounted to one of the base unit and carrier unit at an inner pivot, the second end slidingly engaging the other of the base unit and carrier unit;
 - an outer arm having first and second ends, the first end slidingly engaging the one of the base unit and carrier unit, the second end pivotably mounted to the other of the base unit and carrier unit at an outer pivot, the outer arm pivotably mounted to the inner arm at a scissors axle;
 - a drive for raising the carrier unit;
 - a drum parallel to the scissors axle and couple to the drive to provide rotational movement in both directions;

- a band having first and second ends, the first end connected to the drum; and
- a lifting truck coupled to the second end of the band and positioned between the inner and outer arm so that the axle is between the drum and the truck and movement of the truck toward that axle causes the arms to open.

18. The scissors lifting device of claim 17 wherein the scissors arms have upper sections located between the axle and the carrier unit and lower sections located between the axle and the base unit and the lifting truck is guided by a lifting cam that is arranged on one of the lower section of an arm or the upper section of an arm.

19. The scissors lifting device of claim 17 wherein the scissors arms have upper sections located between the axle and the carrier unit and lower sections located between the axle and the base unit and the lifting truck is guided by lifting cams that are arranged both the lower section of an arm and the upper section of an arm.

20. The lifting device of claim 18 wherein the lifting cam is adjustable and replaceable.

21. The lifting device of claim 17 wherein one arm is pivotably connected to the base unit at a first pivot axis and the drum is positioned at the first pivot axis.

22. The lifting device of claim 17 wherein one arm is pivotably connected to the base unit at a first pivot axis and the drum is positioned such that the distance between the drum and axle is greater than the distance between the first pivot axis and the axle.

23. The lifting device of claim 17 wherein the drive includes a frequency-controlled electric motor.

24. The lifting device of claim 17 wherein the drive includes a brake for realizing controlled lowering of the carrier.

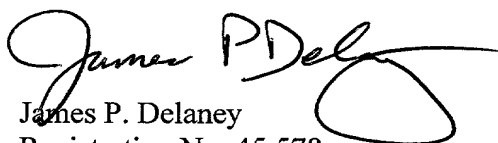
25. The lifting device of claim 17 further including a catch to prevent an uncontrolled lowering movement.

26. A scissors lifting device including a base unit, a carrier unit, first and second scissor-like arms connected at a scissors axle and pivotably and slideably connected relative to the base unit and carrier unit, the lifting device comprising:

- a drive for raising the carrier unit;
- a drum parallel to the scissors axle and coupled to the drive to provide rotational movement in both directions, the drum positioned near a pivotable connection between the first arm and the base unit;
- a band having first and second ends, the first end connected to the drum; and
- a lifting truck coupled to the second end of the band, the truck positioned between the first and second arms on the side of the axle opposite the drum and movable toward and away from the axle so the movement of the truck toward the axle causes the arms to open.

27. The lifting device of claim 26 wherein the scissors arms have upper sections located between the axle and the carrier unit and lower sections located between the axle and the base unit and the lifting truck is guided by a lifting cam that is arranged on at least one of the lower section of the second arm or the upper section of the first arm.

Respectfully submitted,


James P. Delaney
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Dated: November 7, 2001
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Atty. Docket No. JFH-A13082US

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Job No.: 887-84281

Ref.: JFH-A13082US

Translated from German by the Ralph McElroy Translation Company
910 West Avenue, Austin, Texas 78701 USA



WO 00/68597

PCT/EP00/03242

Scissors Lifting table

The invention pertains to a scissors lifting table with a scissors unit located between a carrier device and a base unit, having two pairs of legs pivoting relative to each other about a scissors axis, and with a lifting device which features a lifting truck moving back and forth by means of a drive unit, for opening and closing of the scissors.

A scissors lifting table of this kind for raising and lowering loads, as is used, for example, in the manufacture of automobiles, is described in DE 90 05 566 U1. In this known scissors lifting table, a platform holding the load is raised or lowered by means of two scissors located laterally parallel to each other by opening and closing the scissors legs. Opening and closing the scissors is effected by means of a lifting skid or lifting truck which is moved back and forth between lateral, longitudinal struts of a base unit. The lifting truck features inclined lifting curves at its top side, which cooperate with rollers located in the vicinity of the scissors axis for raising and lowering the platform. The lifting skid is moved with a drive unit by means of a threaded spindle. A spindle of this kind is a precision part and usually runs on a ball bearing support in a spindle nut. This kind of spindle drive is relatively expensive and also is sensitive to transverse forces and vibrations, so that its operation is disturbed and the spindle drive can be damaged.

Some scissors lifting tables with hydraulic actuators are described in documents DE 44 13 527 A1 and in DE 83 29 409 U1. This kind of hydraulic actuator usually causes a jerky starting and stopping and can also cause undesirable, oily discharges.

The invention is based on the problem of preparing a scissors lifting table of the kind described above, so that a dependable, controlled lifting motion is achieved.

This problem is solved by the properties of Claim 1. Accordingly, this invention provides that a fixed-location drum parallel to the scissors axis can be driven with the drive unit so that at least one band-shaped traction means can be moved, said means being coupled to the lifting truck and arranged around said drum, that by means of a drive unit, the band-shaped traction means can be wound onto the drum to open the scissors by pulling the lifting truck in the direction of the scissors axis, and it can be unwound from the drum to close of the scissors by using the motive force of the lifting truck moving in the opposite direction, away from the scissors axis.

With these features, well-controlled starting and stopping of the raising and lowering movements can be achieved, and all with a sturdy and, at the same time, low-cost design. If at least two band-like traction means are used in parallel, then the operation can be temporarily continued even with a damaged traction means.

One construction variant of the invention provides for the lifting truck to be located on the side of the scissors axis facing away from the drum, and another embodiment provides for the lifting truck to be located on the side of the scissors axis facing the drum, and the traction means is guided over a deflection roller.

The lifting motion can be affected in the desired manner in that the lifting truck is guided along lifting curves located at the lower leg sections of one pair of legs or along the upper leg sections of the other pair of legs, or along lifting curves located at the leg sections of both pairs of legs. For example, in this manner a constant lifting load can be achieved, while the tensile load in the band-shaped traction means remains constant in all hoist positions. To vary the motion sequences or load, it is also possible that the lifting curves be adjustable and/or replaceable.

Furthermore, additional favorable construction variants provide for the drum to be located on one lower, fixed pivot axis of one pair of legs, or is located outside of it. If the fixed pivot axis is used for the drum bearing, then additional bearing elements can be eliminated. On the other hand, a configuration outside of the pivot axis can be favorable for maintenance or for band control, under certain conditions.

Favorable drive control is achieved with the modification that the drive unit has a frequency-controlled electric motor, wherein both high lifting speeds and also very accurate lift positioning are attained.

For a controlled lowering and for safety reasons, it is favorable that the drive unit have a braking device for controlled lowering of the carrier.

Also contributing to safety is the fact that a catch device is provided to prevent uncontrolled lowering.

The invention will be explained in greater detail below based on one embodiment, with reference to the figure.

The figure presents a side view of a scissors lifting table with a platform or a carrier device for supporting a load. The carrier device has lateral supports 10, on which the upper ends of a first and second pair of legs 1, 2 are articulated. The left leg ends of the second pair of legs 2 are seated here against a fixed pivot axis, whereas the right leg ends of the first pair of legs 1 are seated upon and can slide in the supports 10 and also pivot on rollers or pins, as is already known. The lower leg ends are seated in lateral rails 11 of a base unit, and the left lower leg ends of the first pair of legs 1 are seated on a fixed pivot axis and the right lower leg ends of the second pair of legs 2 are pivotably mounted to the rail 11 or are seated on rollers. The two pairs of legs 1, 2 are attached to a scissors axle 6 and can pivot relative to each other.

To raise and lower the carrier device or to open and close the scissors formed by the two pairs of legs 1, 2, there is a lifting truck 3 located between the mutually facing sides of the first

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INTERNATIONAL PRELIMINARY EXAMINATION REPORT
SUPPLEMENTARY SHEET

International File No. PCT/EP00/03242

To item V: Substantiated determination according to Article 35 (2) with respect to novelty, inventiveness and commercial applicability; documents and explanations in support of this determination

1. Relevant prior art:

D1: DE 604 156 C (MARTIN) October 15, 1934

D2: US-A-3 785 462 (COAD G ET AL) January 15, 1974

D3: DE 31 44 621 A (RAZ DAN; ELECTRA MIKUN IND LTD (IL)) Septemeber 9, 1982

2. Claim 1 relates to

a scissors lifting table with scissors arranged between a carrier device (10) and a base unit (11), which is provided with a pair of legs (1, 2) which are rotatable relative to each other around an axis (6) of the scissors, and with a lifting device which is provided with a lifting truck (3) which can be moved back and forth by means of a drive (12) for opening and closing the scissors, in which a fixed drum (5), which is positioned parallel to the axis (6) of the scissors, can be driven by the drive (12), by means of which at least one traction means (4), which is placed around said axis and coupled with one end to the lifting truck (3), is movable, and in which the traction means (4) can be wound onto the drum (5) by means of the drive (12) to open the scissors by pulling the lifting truck (3) in the direction of the axis (6) of the scissors, and can be unwound from the drum (5) to close the scissors by using the motive force of the lifting truck (3) moving in the opposite direction away from the axis (6) of the scissors,

wherein

- only one lifting truck (3) exists which is provided on the side of the axis (6) of the scissors that faces away from the drum (5), and
- the traction means has a band-shaped design and runs directly from the drum (5) to the lifting truck (3).

3. A configuration according to the preamble of Claim 1 is sufficiently known, for example, see Document D1, in which a scissors lifting table can be moved via two lifting rollers by means of a rope configuration, developed as a block and tackle that is guided via several guide rollers.

4. One functional problem can be considered in creating a robust and low-cost scissors lifting table which enables the performance of reliable and controlled movements.

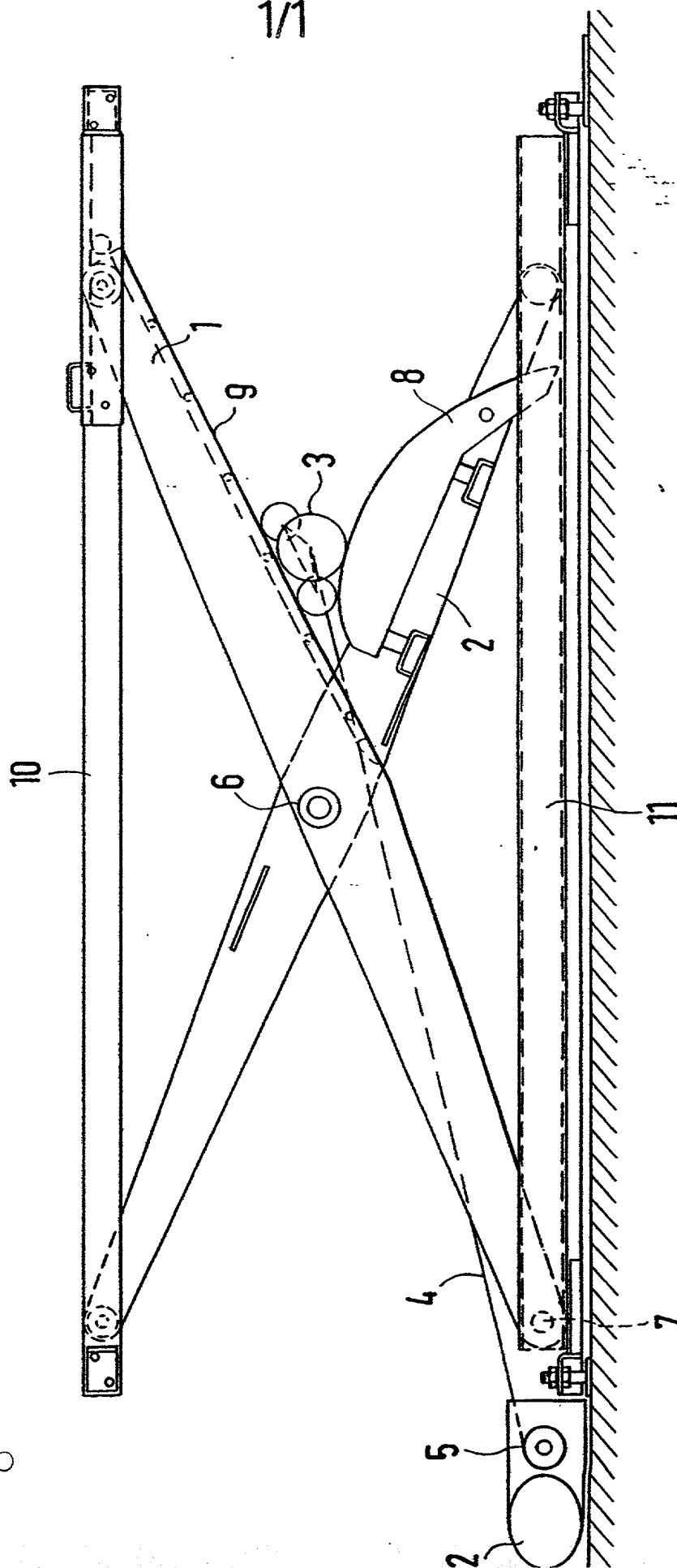
This can be achieved by means of the measures which are listed in the characterizing portion of Claim 1, using a single lifting truck that is provided on the side of scissors axis which faces away from the drum and is connected directly, **that is, without guide rollers**, to the drum via the band-shaped traction means.

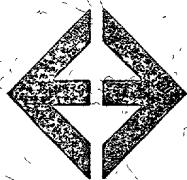
The other documents listed in the search report cannot be considered relevant, for they give no indication of the now claimed and limited teachings of Claim 1.

5. Compared with the existing prior art, the limited object of Claim 1 must be accorded the required inventiveness.

6. The further developments of the dependent claims also meet the PCT requirements.

7. There is no doubt as to the commercial application, and it exists wherever loads must be lifted or lowered.





RALPH MCELROY TRANSLATION COMPANY

EXCELLENCE WITH A SENSE OF URGENCY

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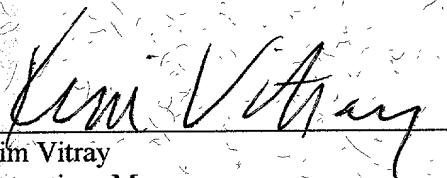
August 27, 2001

Re: 887-84281

To Whom It May Concern:

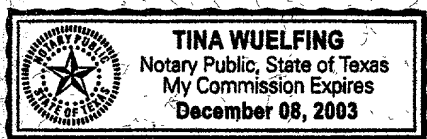
This is to certify that a professional translator on our staff who is skilled in the German language translated the enclosed PCT/EP00/03242 from German into English.

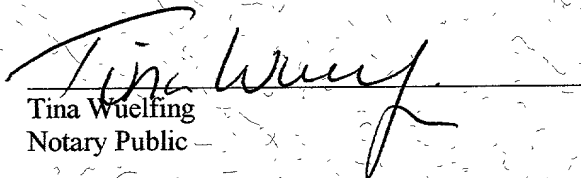
We certify that the attached English translation conforms essentially to the original German language.



Kim Vitray
Operations Manager

Subscribed and sworn to before me this 27 day of AUGUST, 2001.




Tina Wuefling
Notary Public

My commission expires: December 8, 2003

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PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Patent Application of:)

Gerold Heckert)

Serial No.: Not Yet Assigned)

Art Unit: Not Yet Assigned)

Examiner: Not Yet Assigned)

Filed: November 7, 2001)

Title: SCISSORS LIFTING
DEVICE)

EXPRESS LABEL NO. EL 741411852 US

I hereby certify that this correspondence is being deposited with the United States Postal Service as EXPRESS MAIL in an envelope addressed to: ASSISTANT COMMISSIONER FOR PATENTS, NEW APP FEE, WASHINGTON, D.C. 20231 on November 7, 2001.

Name: Kathryn L. Finder

Kathryn L. Finder
SignatureNovember 7, 2001

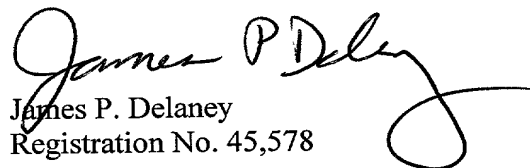
Date

Hon. Commissioner of Patent and Trademarks
Washington, DC 20231**STATEMENT CONCERNING FILING OF SUBSTITUTE
SPECIFICATION PURSUANT TO 37 CFR 1.125**

Sir:

Applicant states that the attached substitute specification and abstract is filed in order to correct any faulty English that resulted from the translation of the originally filed German specification and abstract. Pursuant to 37 CFR 1.125, Applicant submits that acceptance of such substitute specification and abstract, which contain no new matter, would greatly facilitate processing of the application. The Examiner is respectfully requested to accept such substitute specification and abstract.

Respectfully submitted,



James P. Delaney
Registration No. 45,578

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Atty. Docket No. JFH-A13082US

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SCISSORS LIFTING DEVICE

Field of Invention

5 The invention pertains to a scissors lifting table device with at least one pair of scissors arranged between a carrier unit and a base unit. The scissors comprise two arms that can be pivoted relative to one another about a scissors axle or axis. The lifting device further includes a lifting truck which can be moved in opposite directions by means of a drive in order to open and close the scissors. The drive powers a drum
10 that is aligned parallel to the scissors axis and serves to move at least one band that extends around the drum and is coupled to the lifting truck at one end. The band is wound onto the drum by means of the drive in order to open the scissors by pulling the lifting truck toward the scissors axle. The band is unwound from the drum in order to close the scissors through movement of the lifting truck in the opposite direction, i.e.,
15 away from the scissors axle.

Background of the Invention

A scissors lifting table device is described in DE 604 156 C. In this known scissors lifting table, lifting rollers that extend parallel to a scissors axis are arranged on
20 both sides of the scissors axis between the scissors arms. These lifting rollers can be moved toward one another by means of a cable arrangement in the form of a block and pulley so as to lift the carrying device of the scissors lifting table. The lifting rollers can be moved apart from one another so as to lower the carrying device. For this purpose, one end of the cable is connected to a take-up drum that is powered by means
25 of a drive. The cable extends over several guide elements before it reaches the take-up drum.

In another scissors lifting table that is described in U.S. Patent No. 3,785,462, one end of a traction cable is fixed to and wound up at a lower shaft. The traction cable extends around several other deflection rollers and a roller-shaped lifting element
30 that can be moved between the scissors arms. The other end of the traction cable is fixed to the upper section of the lifting table. When the cable is wound/unwound

onto/from the lower shaft that is powered by means of a drive and a chain, the lifting element is respectively moved toward or away from the scissors axis such that the carrying device of the lifting table is lifted or lowered.

Another scissors lifting table for lifting and lowering loads is described in DE 90 05 566 U1. In this known scissors lifting table, a platform that accommodates the load is respectively lifted and lowered by opening and closing the scissors arms of two lateral scissors arranged in parallel. The scissors are opened and closed by means of a lifting sled or lifting truck that is moved backward and forward between longitudinal side braces of a base unit. On its upper side, the lifting truck is provided with obliquely extending lifting cams which cooperate with rollers for lifting and lowering the platform. The lifting cams are positioned near the scissors axis. The lifting sled is powered by means of a drive via a threaded spindle. Such a spindle is a precision part and is usually supported in a ball bearing inside a spindle nut. A spindle drive of this type is relatively costly and is so sensitive to transverse forces and vibrations that the smooth operation of the spindle drive may be impaired and the spindle drive damaged by such forces.

A scissors lifting table with a hydraulic actuator is described in DE 44 13 527 A1 and in DE 83 29 409 U1. A hydraulic actuator of this type typically causes jerks at the beginning and end of the opening and closing movements, and may also cause undesirable oily deposits.

Summary of the Invention

The objective of this invention is to provide a scissors lifting table of the initially described type that ensures a reliable and controlled lifting movement.

This objective is attained through the inventive arrangement of a carrier unit and base unit interconnected by at least one pair of scissors arms, a drum for winding traction means to provide a force, and a lifting truck positioned between the scissors arms so that it can be pulled toward the scissors axis by the traction means. It is preferred that only one lifting truck is provided and that the traction means is a band that extends directly from the drum to the lifting truck.

This construction allows the beginning and the end of the lifting and lowering

movement to be controlled in a superior fashion while simultaneously achieving a more robust and less expensive design. In addition, if at least two band-like traction means are utilized in a parallel fashion, the lifting table can continue to operate when one of the traction means is damaged.

5 The lifting movement can be controlled to operate in a desired fashion by the use of lifting cams which guide the lifting truck and are arranged on the lower arm sections of one pair of parallel arms, on the upper arm sections of the other pair of parallel arms, or in both positions. For example, through use of a specific design of lifting cams a constant lifting load can be achieved wherein the tensile stress in the
10 band-like traction means remains constant in all lifting and lowering positions. To provide this capability, the lifting cams may be adjustable or exchangeable in order to vary the movement sequence or the load.

 Another advantageous characteristic of the invention is the fact that the drum is arranged at the lower fixed pivot shaft where one of the arms pivotably connects to the
15 base unit. Alternatively, the drum is arranged "outside" the lower fixed pivot shaft so that the lower fixed pivot shaft is between the drum and the lifting truck. If a fixed pivot shaft is used to support the drum, additional bearing elements can be eliminated. Under certain circumstances, the arrangement wherein the drum is positioned outside the pivot shaft may be advantageous with respect to maintenance considerations or
20 guidance of the band.

 Superior control of the drive is achieved due to the fact that the drive contains a frequency-controlled electric motor. When utilizing a frequency-controlled electric motor, high lifting speeds and very precise positioning can be achieved.

 In order to achieve a controlled lowering movement and to conform with
25 applicable safety standards, it is preferred that the drive be provided with a brake for lowering the carrier unit in a controlled fashion.

 In addition, safety is improved due to the fact that a catch device is provided for preventing an uncontrolled lowering movement.

30 Brief Description of Drawings

 The invention is described below with reference to one embodiment that is

illustrated in Figure 1 as a side view.

Detailed Description of Preferred Embodiments

Figure 1 shows a side view of a scissors lifting device that contains a platform
5 or a carrier unit for accommodating a load. The carrier unit contains lateral supports
10, to which the upper ends of two first arms 1 and two second arms 2 are connected.
The upper ends of arms 2 are supported on upper fixed pivot shafts and the upper ends
of arms 1 are conventionally movably supported in a pivotable fashion in the supports
10 on rollers or pins. The lower ends of both arms 1,2 are supported in lateral rails 11
10 of a base unit. The lower ends of first arms 1 are supported on lower fixed pivot shafts
7 and the lower ends of second arms 2 are movably supported in a pivotable fashion on
the rail 11, for example, on rollers. Each reciprocal pair of arms 1,2 are connected at a
scissors axle 6 such that they can be pivoted relative to one another.

In order to lift and lower the carrier unit 10 or to open and close the two
15 reciprocal pairs of scissors formed by the two pairs of arms, a lifting truck 3 is
displaceably or movably arranged between the upper portions of arms 1 and the lower
portions of arms 2 that face one another. In addition, suitable lifting cams 8,9 for
influencing the movement or the load are arranged along the sides of the arms 1,2
which face one another so that the lifting truck 3 is guided on the lifting cams.

20 The lifting truck 3 is pulled toward the scissors axle 6 by means of one or more
traction bands 4 that, if applicable, lie adjacent to one another. Movement of the lifting
truck toward the axle 6 lifts the carrier unit and opens the scissors. In the drawing the
tension bands 4 are wound up by means of a drum 5. Drum 5 is arranged on the far
side of the scissors axle 6 with reference to the lifting truck 3 and is coupled to a drive
25 12. In order to lower the carrying device and close the scissors, the lifting truck 3 is
forced away from the scissors axle 6 due to the dead weight of the arms 1,2 and carrier
unit 10 when tension bands 4 are unwound from drum 5. During this lowering action
the drive 12 or a corresponding transmission thereof may act as a brake, or a separate
brake may be provided.

30 The drive 12 preferably contains a frequency-controlled electric motor that
makes it possible to achieve high lifting speeds and highly precise positioning. The start

of the lifting or lowering movement and the movement sequences can be programmed by means of a corresponding control device. In particular, a soft start and stop can be programmed for the initial phase and the final phase of the respective movements.

The drum 5 may be supported on the fixed pivot shaft 7 or separately from it.

- 5 In order to prevent an uncontrolled lowering movement of the carrier unit 10, it is preferred that a catch device that becomes effective during a fast lowering movement is provided.

Claims

SEE ATTACHED PRELIMINARY AMENDMENT

10031861 110701

ABSTRACT

The invention relates to a scissors-like lifting device having a pair of scissors that are arranged between a carrier or support unit and a base unit. Each pair of
5 scissors is provided with two arms which can be pivoted about corresponding axles. The scissors-like lifting device is provided with a lifting truck that can be moved by means of a drive in order to open and close the scissors. The inventive configuration efficiently controls the lifting movement. The band-like traction mechanism can be wound-up on the drum by means of the drive in order to pull the lifting truck towards
10 the scissors axle so that the scissors are opened. The band-like traction device can be unwound from the drum so that the truck is moved away from the scissors axle by the force of gravity on the support and arms thereby closing the scissors.

SCISSORS LIFTING [TABLE] DEVICE

5 Field of Invention

The invention pertains to a scissors lifting table device with at least one pair of scissors arranged between a [carrying device] carrier unit and [the] a base unit[,]. The [wherein said] scissors [contain two pairs of legs] comprise two arms that can be pivoted relative to one another about a scissors axle or axis[, and with a lifting device

10 that contains]. The lifting device further includes a lifting truck which can be moved [backward and forward] in opposite directions by means of a drive in order to open and close the scissors[, wherein the drive drives]. The drive powers a [stationary] drum that is aligned parallel to the scissors axis and serves to move at least one [traction means] band that extends around [this] the drum and is coupled to the lifting

15 truck at one end[, and wherein the traction means can be]. The band is wound onto the drum by means of the drive in order to open the scissors by pulling the lifting truck [in the direction of] toward the scissors [axis, and] axle. The band is unwound from the drum in order to close the scissors [by moving] through movement of the lifting truck in the opposite direction, i.e., away from the scissors [axis] axle.

20

Background of the Invention

A scissors lifting table device [of this type] is described in DE 604 156 C. In this known scissors lifting table, lifting rollers that extend parallel to a scissors axis are arranged on both sides of [this] the scissors axis between the [scissor legs] scissors

25 arms. These lifting rollers can be moved toward one another by means of a cable arrangement [that is realized] in the form of a block and pulley so as to lift [a] the carrying device of the scissors lifting table[, and]. The lifting rollers can be moved apart from one another so as to lower [said] the carrying device. For this purpose, one end of the cable is connected to a take-up drum that is powered by means of a drive.

30 The cable extends over several guide elements before it reaches the take-up drum.

In another scissors lifting table that is described in [US-A] U.S. Patent No.

3,785,462, one end of a traction cable [that] is fixed to and wound up at a lower shaft [at one end is wound up at either side of this lower shaft]. The traction cable extends around several other deflection rollers [, among other things,] and a roller-shaped lifting element that can be moved [backward and forward] between the [scissor legs, with the] scissors arms. The other end of the traction cable [being] is fixed to the upper section of the lifting table. When the [traction means are] cable is wound/unwound onto/from the lower shaft that is powered by means of a drive and a chain, the lifting element is respectively moved toward or away from the scissors axis such that the carrying device of the lifting table is lifted or lowered.

10 Another scissors lifting table for lifting and lowering loads is described in DE 90 05 566 U1. In this known scissors lifting table, a platform that accommodates the load is respectively lifted and lowered by [means] opening and closing the scissors arms of two lateral scissors [that are] arranged in parallel [to one another, namely by opening and closing the scissor legs]. The scissors are opened and closed by means of
15 a lifting sled or lifting truck that is moved backward and forward between longitudinal side braces of a base unit. On its upper side, the lifting truck is provided with obliquely extending lifting cams[,], which cooperate with rollers for lifting and lowering the platform[, that]. The lifting cams are [arranged in the vicinity of] positioned near the scissors axis. The lifting sled is powered by means of a drive via a threaded spindle.
20 Such a spindle [represents] is a precision part and is usually supported in a ball bearing inside [of] a spindle nut. A spindle drive of this type is relatively costly and is so sensitive to transverse forces and vibrations [such] that the smooth operation of the spindle drive may [become] be impaired and the spindle drive [is] damaged by such forces.

25 A scissors lifting table with a hydraulic actuator is described in DE 44 13 527 A1 and in DE 83 29 409 U1. A hydraulic actuator of this type [usually] typically causes jerks at the beginning and end of the [movement] opening and closing movements, and may also cause undesirable oily deposits.

30 Summary of the Invention

The [invention is based on the] objective of [making available] this invention is

to provide a scissors lifting table of the initially described type that ensures a reliable and controlled lifting movement.

This objective is attained [with the characteristics of Claim 1. According to this claim,] through the inventive arrangement of a carrier unit and base unit interconnected
5 by at least one pair of scissors arms, a drum for winding traction means to provide a
force, and a lifting truck positioned between the scissors arms so that it can be pulled
toward the scissors axis by the traction means. It is preferred that only one lifting
truck is provided [, which is arranged on the side of the scissors axis that faces away
from the drum,] and that the traction means [are realized in the form of] is a band [and
10 extend] that extends directly from the drum to the lifting truck.

[Because of these measures,] This construction allows the beginning and the
end of the lifting and lowering movement [can] to be controlled in a superior fashion
while simultaneously achieving a more robust and less expensive design. [If] In
addition, if at least two [band-shaped] band-like traction means are utilized in a parallel
15 fashion, the lifting table [is still able to operate temporarily] can continue to operate
when one of the traction means is damaged.

The lifting movement can be [influenced in the] controlled to operate in a
desired fashion [due to the fact that the lifting truck is guided by means] by the use of
lifting cams [that] which guide the lifting truck and are arranged on the lower [leg] arm
20 sections of one pair of [legs] parallel arms, [or] on the upper [leg] arm sections of the
other pair of [legs] parallel arms, or [on the leg sections of] in both [pairs of legs]
positions. For example, through use of a specific design of lifting cams a constant
lifting load can be achieved [in this fashion,] wherein the tensile stress in the
[band-shaped] band-like traction means remains constant in all lifting and lowering
25 positions. [In this case,] To provide this capability, the lifting cams may be [realized
adjustably and/or exchangeably] adjustable or exchangeable in order to vary the
movement sequence or the load [, respectively].

Another advantageous [embodiment is characterized by] characteristic of the
invention is the fact that the drum is arranged [on a] at the lower fixed pivot [axis of
30 one pair of legs, or outside this] shaft where one of the arms pivotably connects to the
base unit. Alternatively, the drum is arranged "outside" the lower fixed pivot shaft so

that the lower fixed pivot shaft is between the drum and the lifting truck. If a fixed pivot [axis] shaft is used to support the drum, additional bearing elements can be eliminated. Under certain circumstances, the arrangement wherein the drum is positioned outside the pivot [axis] shaft may be advantageous with respect to maintenance considerations or guidance of the band.

[Favorable] Superior control of the drive is achieved due to the fact that the drive contains a frequency-controlled electric motor. [In this case,] When utilizing a frequency-controlled electric motor, high lifting speeds [, as well as] and very precise positioning[,] can be achieved.

In order to achieve a controlled lowering movement and to conform with applicable safety standards, it is [advantageous] preferred that the drive be provided with a brake for lowering the carrier unit in a controlled fashion.

[Safety is additionally] In addition, safety is improved due to the fact that a catch device is provided for preventing an uncontrolled lowering movement.

Brief Description of Drawings

The invention is described below with reference to one embodiment that is illustrated in [the figure] Figure 1 as a side view.

Detailed Description of Preferred Embodiments

[The figure] Figure 1 shows a side view of a scissors lifting [table] device that contains a platform or a [carrying device, respectively,] carrier unit for accommodating a load. The [carrying device] carrier unit contains lateral [carriers] supports 10, to which the upper ends of [a first and a second pair of legs] two first arms 1 [, 2] and two second arm 2 are connected [in an articulated fashion]. The [left leg ends of the second pair of legs] upper ends of arms 2 are [, for example,] supported on [a] upper fixed pivot [axis] shafts[, with] and the [right leg ends of the first pair of legs] upper ends of arms 1 [being] are conventionally movably supported in a pivotable fashion in the [carriers] supports 10 on rollers or pins. The lower [leg] ends of both arms 1,2 are supported in lateral rails 11 of a base unit[, wherein the left lower leg]. The lower ends [of the first pair of legs] of first arms 1 are supported on [a] lower fixed pivot [axis]

shafts 7 and the [right] lower [leg] ends of [the] second [pair of legs] arms 2 are movably supported in a pivotable fashion on the rail 11, for example, on rollers. [The two pairs of legs] Each reciprocal pair of arms 1,2 are connected at a scissors [axis] axle 6 such that they can be pivoted relative to one another.

5 In order to lift and lower the [carrying device] carrier unit or to open and close the two reciprocal pairs of scissors formed by the two pairs of [legs] arms [1,2, respectively], a lifting truck 3 is displaceably or movably arranged between the [sides of the first and the second pair of legs 1, 2] upper portions of arms 1 and the lower portions of arms 2 that face one another. In [this case] addition, suitable lifting cams
10 8,9 for influencing the movement or the load[, respectively,] are arranged [between the edges of the pairs of legs] along the sides of the arms 1,2 [,] which face one another [wherein] so that the lifting truck 3 is guided on [said] the lifting cams.

The lifting truck 3 is pulled toward the scissors [axis] axle 6 by means of one or more traction bands 4 that, if applicable, lie adjacent to one another[, so as to lift].
15 Movement of the lifting truck toward the axle 6 lifts the [carrying device] carrier unit and [to open] opens the scissors[, respectively]. [In this case,] In the drawing the tension [band(s)] bands 4 [is/are] are wound up by means of a drum 5 [that]. Drum 5 is arranged on the [other] far side of the scissors [axis] axle 6 with reference to the lifting truck 3[, wherein said drum] and is coupled to a drive 12. In order to lower the
20 carrying device and [to] close the scissors, [respectively,] the lifting truck 3 [moves] is forced away from the scissors [axis] axle 6 due to the dead weight of the [scissors lifting table such that the] arms 1,2 and carrier unit 10 when tension bands 4 are unwound from [the] drum 5. [In this case,] During this lowering action the drive 12 or a corresponding transmission thereof may act as a brake, or a separate brake may be
25 provided.

The drive 12 preferably contains a frequency-controlled electric motor that makes it possible to achieve high lifting speeds and highly precise positioning. The start of the lifting or lowering movement and the movement sequences can be programmed by means of a corresponding control device. In [this case] particular, a soft start and
30 stop can[, in particular, also] be programmed for the initial phase and the final phase of the respective movements.

The drum 5 may be supported on the fixed pivot [axis] shaft 7 or separately from it. In order to prevent an uncontrolled lowering movement of the [carrying device] carrier unit 10, it is [advantageous to provide] preferred that a catch device that becomes effective during a fast lowering movement is provided.

Claims

SEE ATTACHED PRELIMINARY AMENDMENT

10031861.140701
T00T T00T00T

ABSTRACT

10034564.1.10704
T0207T T99T00T

The invention relates to a scissors-like [lift table with] lifting device having a pair of scissors that [is] are arranged between a carrier or support [device (10)] unit and a base unit [(11)]. [Said] Each pair of scissors is provided with two [pairs of limbs (1,2)] arms which can be pivoted about [an axle] corresponding axles [(6) pertaining to the scissors and in relation with one another]. The scissors-like [lift table also comprises a] lifting device [which] is provided with a lifting [vehicle (3)] truck that can be moved [to and fro] by means of a drive [device (12)] in order to open and close the scissors. The [aim of the invention is to] inventive configuration efficiently [control] controls the lifting movement. The [band-shaped] band-like traction mechanism [(4)] can be wound-up [n] on the [roller (5)] drum by means of the drive [device (12) and by drawing] in order to pull the lifting [vehicle (3)] truck towards the scissors axle [(6) of the scissors in order to open] so that the scissors [and] are opened. The band-like traction device can be unwound from the [roller (5)] drum so that the truck is moved away from the scissors axle [(6) of the scissors] by the [means of the movement] force of [the lifting vehicle (3) in order to close] gravity on the support and arms thereby closing the scissors.

Docket No.
JFH-A13082US

Declaration and Power of Attorney For Patent Application

English Language Declaration

As a below named inventor, I hereby declare that:

My residence, post office address and citizenship are as stated below next to my name,

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled

Scissors-Type Lift Table

the specification of which

(check one)

☒ is attached hereto.

☐ was filed on _____ as United States Application No. or PCT International Application Number _____ and was amended on _____ (if applicable)

I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims, as amended by any amendment referred to above.

I acknowledge the duty to disclose to the United States Patent and Trademark Office all information known to me to be material to patentability as defined in Title 37, Code of Federal Regulations, Section 1.56.

I hereby claim foreign priority benefits under Title 35, United States Code, Section 119(a)-(d) or Section 365(b) of any foreign application(s) for patent or inventor's certificate, or Section 365(a) of any PCT International application which designated at least one country other than the United States, listed below and have also identified below, by checking the box, any foreign application for patent or inventor's certificate or PCT International application having a filing date before that of the application on which priority is claimed.

Prior Foreign Application(s)			Priority Not Claimed
199 21 435.2	Germany	08/05/1999	<input type="checkbox"/>
(Number)	(Country)	(Day/Month/Year Filed)	
100 01 910.2	Germany	19/01/2000	<input type="checkbox"/>
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I hereby claim the benefit under 35 U.S.C. Section 119(e) of any United States provisional application(s) listed below:

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(patented, pending, abandoned)

(Application Serial No.)

(Filing Date)

(Status)
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(Filing Date)

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I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

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